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[摘要]

近代電子產品面臨微小化後散熱不易的嚴重問題，導致需要尋求一種更快速有效的散熱技術。一種名爲脈動式熱管
相系統的脈動作動原理，可將熱由熱管的一端有效傳至另一端，可滿足上述高散熱量的需求。由於脈動式熱管構造
用(特別是在微電子冷卻應用上)。本研究目的以實驗方法對封閉迴路式脈動式熱管的熱傳性能進行有系統的研究探
行液汽柱獨立共存的兩相流裝填，以可視化流場觀測外，並探討不同設計參數如工作流體(水、甲醇、Cuo奈米流體
能的影響。
研究結果顯示(1)PHP運作時管內流場的型態會隨熱負荷的多寡而改變，及流場之流動模式可分爲震盪期、過渡期與
減。(3)工作流體之填充比會影響PHP之熱傳特性，Cuo奈米流體和水在填充比爲30%，甲醇爲50%時，PHP之性能
Cuo氧化銅之PHP性能最佳，但傾斜角β=0°(即水平擺置時)，填充甲醇之PHP，在低負荷下(20W以下)亦能順利作動
粒會凝結貼附於PHP管壁上，導致濃度降低，性能接近水，影響PHP熱傳性能。

[英文摘要]

Modern microelectronics thermal management is facing considerable challenges in the wake of miniaturizing of c
dissipation. A new heat transfer device (called pulsating heat pipe (PHP)), which can transfer effectively the heat
of the liquid-vapor system, can fit to the above need. Due to the simple design, cost effectiveness and excellent t
(especially using in the electronic cooling). In this project, an experimentally investigation is conducted to explore
pulsating heat pipes filled with slug-plug-train two-phase flow field are developed by implementation for the purpo
various design parameters, e.g., working fluid (Cuo nanofluid, water, and methanol), filling ratio, input heat flux, a
are also analyzed.
The experimental results show that (1) The input heat flux will change the flow pattern inside the PHP tube, whic
and stable periods; (2) The PHP heat resistance decreases with increasing heat load; (3) The PHP exhibits the b
nanofluid or water, and when FR=50% for methanol; (4) The PHP filling with 1.0 %wt CuO nanofluid presents the
when 30°≦β≦90°. While PHP filling with methanol can start to work at lowest heat load (20W) when β=0°. It shou
the nanofluid and stick on inner surface of tubes during PHP operation, which reduces the CuO concentration an

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